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| In re the application of: |) | |
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| CHARLES CALVIN BYERS ET AL. |) | Group Art Unit: 2882 |
| Filed: April 17, 2001 |) | Examiner: T.R. Artman |
| For: OPTICAL INTERCONNECT FOR |) | |
| MEZZANINE CIRCUIT BOARDS |) | |
| Commissioner for Patents | | |

DECLARATION OF PRIOR INVENTION IN THE UNITED STATES TO OVERCOME CITED PATENT OR PUBLICATION (37 C.F.R. 1.131)

We, Charles Calvin Byers, Stephen Joseph Hinterlong, and Robert Allen Novotny, declare the following:

- 1. We are the co-inventors of claims 1-27 of the above-identified patent application and co-inventors of the subject matter described and claimed therein.
- 2. Prior to February 2, 2001, we had completed, in this country, the invention as described and claimed in the subject application, as evidenced by the following:
 - a. Prior to February 2, 2001, having earlier conceived the idea of an optical interconnect for connecting mezzanine circuit boards to a base or main board, we prepared a patent submission (copy attached hereto as Exhibit A) containing a brief description and a detailed description of the invention, a statement of the invention's objective, a comparison of the invention over the prior art, the projected commercial use of the invention, and a diagram of an embodiment of the invention. The patent submission was signed by Mr. Byers and submitted to Jack R. Penrod, corporate counsel of Lucent Technologies' Intellectual Property department, for purposes of requesting a patentability opinion.
 - b. The detailed description of the invention in the patent submission describes the shortcomings in the prior art and the advantages of the invention. The description also describes the invention generally and details an embodiment of the invention. Finally, the description discloses that optical links between the mezzanine board and the base board may be made through physical contact or through free space. Free space as a potential optical transport medium is suggested as an embodiment by employing lens to focus light as beams across the gap between the mezzanine board and the base board. (Ex. A, p. 3)

- c. The diagram of the invention in the patent submission (Ex. A, p. 4), although not a formal drawing, is similar to drawings of the invention in the subject application.
- d. Each of the dates deleted from Exhibit A is prior to February 2, 2001.
- 3. Reginald J. Hill, having been authorized to prepare a patent application for our invention, contacted us via his e-mail of January 7, 2001 (copy attached hereto as Exhibit B) to schedule a meeting to discuss the prosecution of our invention, and we met with Mr. Hill around the second week of January 2001.
- 4. Mr. Hill forwarded the first draft of the patent application, along with informal drawings, accompanied by his cover letter of February 19, 2001 (copy attached hereto as Exhibit C).
- 5. Mr. Novotny submitted comments on the application to Mr. Hill via his facsimile of February 27, 2001 (copy attached hereto as Exhibit D).
- 6. Mr. Hill forwarded a second draft of the application, including informal drawings, accompanied by his cover letter of March 16, 2001 (copy attached hereto as Exhibit E), requesting additional comments on the application.
- 7. Mr. Hill forwarded a final draft of the application along with draft formal drawings, accompanied by his cover letter of April 6, 2001 (copy attached hereto as Exhibit F), indicating that the final application would be sent out for signature on April 9, 2001.
- 8. Mr. Hill forwarded, along with a cover letter of April 9, 2001 (copy attached hereto as Exhibit G), the final application for execution via UPS Next Day Air (copy of shipping receipts attached hereto as Exhibit H). We promptly returned the executed application to Mr. Hill for filing.
- 9. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Redacted

Patent Review - Request for Legal Opinion-

Submit to: INTELLECTUAL PROPERTY - LAW

ATTENTION: C. L. WARREN, CORPORATE CQUINSEL (IH 2A-402)

SUBJECT: Supplemental interconnect for Standard Mezzanine Circuit Boards

Redacted

OBJECTIVE: (What problem does the proposal solve or what purpose does it serve?)

Permits standard mezzanine boards (such as PMC cards) to conform to standard footprints, while simultaneously greatly increasing their interconnect bandwidth with the base board.

BRIEF DESCRIPTION: (1. What is it? 2. How does it operate? Rely on attachments for detailed description)

- 1) An additional optical interconnect path that works in parallel with the standard mezzanine board connector's bandwidth
- 2) It provides a very high bandwidth, optical interconnect path in parallel with the standard mezzanine board's connectors. The optical paths are created by placing one optical transmitter and one optical receiver on each of the mezzanine and base boards, arranges so their optical paths align.

COMPARISON: (1. What is the know prior art, if any? 2. What are the differences over the prior art? 3. What commercial benefits are derived from these differences?)

- 1) There is some work on photonic backplanes
- 2) This is not a backplane, but a mezzanine card interconnect. It also has a unique physical design.
- 3) If the base board is equipped with this invention, both standard off the shelf mezzanine cards without the supplemental link and advanced cards with the link will work.

USE: (1. What is the probability of commercial use? 2. What is the expected annual sales volume or revenue, if used? 3. Who outside of Lucent may use it commercially?)

- 1) High
- 2) \$100sM
- 3) Any maker of high density board level electronic products

ORGINATORS OF THE PROPOSAL: (NAME, DEPT. # AND PHONE #)

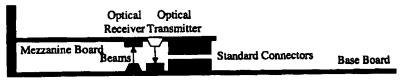
Charles C. Byers JR1B0BG00 (630)979-6184 Stephen J. Hinterlong JR1B0BC00 (630)713-5422 Robert A. Novotny JR1B0BC00 (630)713-5419

| BUSINESS UNIT(S) INVOLVED: | | |
|---|----------------------------|--|
| Attorney Consulted: (Name and date) | | Ext |
| Submitted by: Charles (1/22-2 | Ext. 9600 | 84 Date: Redacted |
| Approved By: | | |
| Attachments: Yes No Financial Proj This form should be completely filled in and sign should be approved by the inventor's supervisor. | ed by one of Two copies | the inventors. The completed form of the approved form and any |

There are many advantages to using standard mezzanine boards to provide I/O interfaces or processors on high density electronic systems. Standards such as PCI Mezzanine Card (PMC) permit the installation of many different Commercial Off The Shelf (COTS) board types without the need to develop hardware for each type. The difficulty is that the standard buses lack the bandwidth, performance, or reliability needed to support some advanced services. What is needed, therefore is a method to provide a standard mezzanine slot on the base board of the system permitting the installation of standard cards, while at the same time providing a capability to supplement the standard interconnect with a much faster interface.

This invention provides such a capability. A standard mezzanine board form factor, with its low performance interface connectors is supplemented with an additional interface. This interface uses bi-directional board to board optical links to provide a supplemental bandwidth to the standard connectors. One embodiment uses an optical detector and transmitter surface mounted to the bottom of the mezzanine board, in optical alignment with a similar transmitter and receiver pair surface mounted on the top of the base board. When the mezzanine board in installed in the standard sockets on the base board, the supplemental optical link can provide many gigabits per second of additional bandwidth. If a standard mezzanine board without the optical link components is installed, there is no interference with the optical components on the base board (but of course, only the standard connector bandwidth is available).

The optical links may use physical contact, such as light pipes, fibers or ferules, to direct the light across the small gap between the mezzanine and base board mounted components, or simple lenses could be employed to focus the light across the gap as beams.



Optical Optical Transmitter Receiver



Reginald J. Hill

From: Sent:

To: Subject: Reginald J. Hill [hill_reg@email.msn.com]
Sunday, January 07, 2001 12:16 PM
Charles C. Byers (E-mail); Stephen J. Hinterlong (E-mail); Robert A. Novotny (E-mail)

Re IDS 121397

Re: Supplemental Interconnect for Mezzanine Circuit Boards

Chuck, Stephen and Robert,

I would like to meet with you to discuss the patent disclosure identified above. Are you available to meet Tuesday, Jan. 9 or Wednesday, Jan. 10 in the morning or Thursday, Jan. 11 at 9:30 am or 3:00 pm.? It is not necessary that you all attend as long as the attendees have full knowledge of the invention.

Is there some pending disclosure or other event that is driving an earlier filing date than 2/15/2001?

Reggie Hill

R.J. Hill & Associates, Ltd. 19 S. LaSalle Street, Suite 1402 Chicago, Illinois 60603 (312) 236-3672 (312) 236-6266 fax reggie@rjhillfirm.com

This communication may be subject to the attorney-client, work product, or other privilege and is confidential. If you are not the intended recipient, please contact the sender immediately.

| EXHIBIT | Ì |
|---------|---|
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| | I |

LAW OFFICES R.J. HILL & ASSOCIATES, LTD. 19 SOUTH LASALLE STREET, SUITE 1402 CHICAGO, ILLINOIS 60603

REGINALD J. HILL

TELEPHONE 312-236-3672
FACSIMILE 312-236-6266

February 19, 2001

VIA FACSIMILE

Charles C. Byers
Stephen J. Hinterlong
Robert A. Novotny
Lucent Technologies Inc.
2000 Naperville Road
P. O. Box 3033
Naperville, IL 60566-7050

Re: U. S. Patent Application for

Optical Interconnect for Mezzanine Circuit Boards

Lucent IDS No. 121397 Our File No. 50001-10390

Dear Chuck, Steve and Bob,

Enclosed is a draft of the above-identified patent application, including informal drawings. Please review the application and provide me any comments. I look forward to hearing from you soon.

Very truly yours,

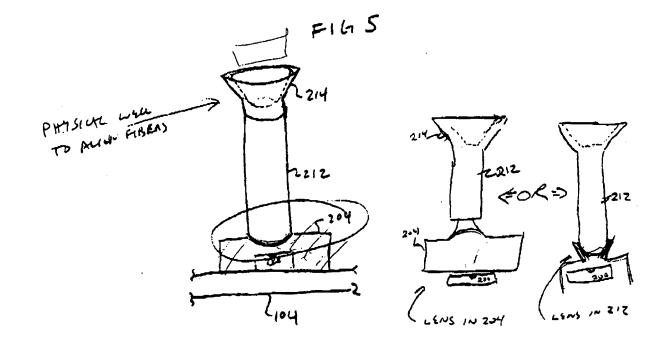
Reginald J. Hill

RJH:cl Attachments

cc: Jack R. Penrod, Esq. (via facsimile w/attachments)

EXHIBIT C

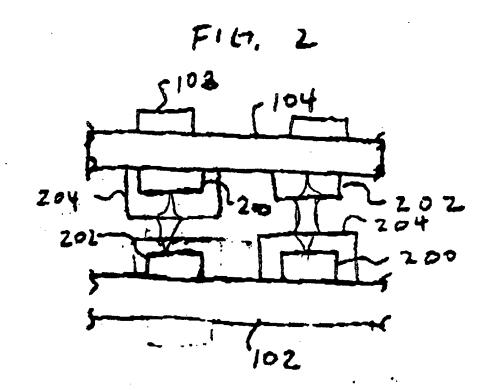
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LAW OFFICES R.J. HILL & ASSOCIATES, LTD. 19 SOUTH LASALLE STREET, SUITE 1402 CHICAGO, ILLINOIS 80603

REGINALD J. HILL

TELEPHONE 312-236-3672 FACSIMILE 312-236-6266

March 16, 2001

VIA FACSIMILE

Charles C. Byer's
Stephen J. Hinterlong
Robert A. Novotny
Lucent Technologies Inc.
2000 Naperville Road
P. O. Box 3033
Naperville, IL 60566-7050

Re: U. S. Patent Application for

Optical Interconnect for Mezzanine Circuit Boards

Lucent IDS No. 121397 Our File No. 50001-10390

Dear Chuck, Steve and Bob,

Enclosed is a revised draft of the above-identified patent application, including informal drawings. I have asked that formal drawings be prepared and will forward them to you when I receive them. Please review the application and provide me any additional comments. I look forward to hearing from you soon.

Very truly yours,

Reginald J. Hill

RJH:cl Attachments

cc: Jack R. Penrod, Esq. (via facsimile w/attachments)



REGINALD J. HILL

TÉLEPHONE 312-236-3672 FACSIMILE 312-236-6266

April 6, 2001

VIA FACSIMILE

Charles C. Byers
Stephen J. Hinterlong
Robert A. Novotny
Lucent Technologies Inc.
2000 Naperville Road
P. O. Box 3033
Naperville, IL 60566-7050

Re: U. S. Patent Application for

Optical Interconnect for Mezzanine Circuit Boards

Lucent IDS No. 121397 Our File No. 50001-10390

Dear Chuck, Steve and Bob,

Enclosed is a final draft of the above-identified patent application, including draft formal drawings. The formal drawings need a minor correction as shown. I anticipate I will have the corrected drawings by Monday, April 9. Unless you provide comments otherwise, I will send out the final application for signature on Monday evening. Thanks for your help and cooperation on this matter.

Very truly yours,

Reginald J. Hill

RJH:cl Attachments

cc: Jack R. Penrod, Esq. (via facsimile w/attachments)

LAW OFFICES R.J. HILL & ASSOCIATES, LTD. 19 SOUTH LASALLE STREET, SUITE 1402 CHICAGO, ILLINOIS 60603

REGINALD J. HILL

TELEPHONE 312-236-3672 FACSIMILE 312-236-6266

April 9, 2001

VIA UPS NEXT DAY AIR

Mr. Charles Calvin Byers Lucent Technologies 2000 Naperville Road P.O. Box 3033

Naperville, IL 60566-7033

Mr. Stephen Joseph Hinterlong Lucent Technologies 2000 Naperville Road P. O. Box 3033 Naperville, IL 60566-7033

Mr. Robert Allen Novotny Lucent Technologies 2000 Naperville Road P.O. Box 3033 Naperville, IL 60566-7033

Re:

U. S. Patent Application for Optical Interconnect

for Mezzanine Circuit Boards

IDS No. 121397

Our File No. 50001-10390

Dear Chuck, Stephen and Robert:

Enclosed is a final draft of the above-identified patent application. Also enclosed are a Declaration and Power of Attorney and an Assignment and Agreement.

Please carefully read the patent application to ensure that it adequately and accurately describes your invention. Please contact me immediately if you have any additional comments or changes for the application. It is important that we all agree on the content of the application before the Declaration and Power of Attorney and Assignment and Agreement are executed by you.

Once we have all agreed that the application is final, you should carefully read the Assignment and Agreement and Declaration and Power of Attorney and execute those documents. Please note that the Assignment must be notarized. Also note that the

Mr. Charles Calvin Byers
Mr. Stephen Joseph Hinterlong
Robert Allen Novotny
April 9, 2001
Page Two

Declaration and Power of Attorney and the Assignment must be executed on the same day.

If you are aware of any publications or other references that may be relevant to the patentability of the application, please provide them to me. Please call me if you need clarification on the publications or references that may be relevant.

Finally, I am enclosing a prepaid envelope for you to return the executed Assignments and Declarations to me overnight mail via UPS. You can return the executed documents to me separately or you might consider coordinating the signing of the documents and returning them together to me.

Please call me if you have any questions about my instructions. I look forward to hearing from you soon.

RJH:cl Enclosures

cc: Mr. Jack R. Penrod, Esq., via facsimile (w/encl.)

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